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TRANSLATION

A SUPERHETERODYNE MEASURING RECEIVER

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A SUPERHETERODYNE MEASURING RECEIVER

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In basic patent No. 118081 a receiver for measuring super-high frequencies is described, in which a noise generator is used for antiphase compensation of parasitic modulation of receiver set noises arising during signal modulation at the input of the intermediate frequency amplifier.

In the proposed superheterodyne measuring receiver, for decreasing the instability of compensation of a parasitic modulation of mixer noises, as the source of noises of a compensation channel mixer noises are used which do not coincide with a signal spectrum; for this, a preamplifier of the i-f compensation channel is made with an intermediate frequency which differs from the intermediate frequency of the main channel, while for subsequent coincidence of intermediate frequencies it contains a shifting frequency converter.

A block diagram of the described measuring receiver is illustrated.

SHF signals are fed into mixer 1 which is used as an auxiliary antiphase-modulated noise source. To mixer 1 is attahced heterodyne 2 for producing at the output of the mixer an i-f signal. The spectrum

of mixer noises proceeds in turn through synchronous switch 3 to the inputs of i-f preamplifiers 4,5 having different frequencies. I-f preamplifier 5 of the compensation channel is designed for intermediate frequency f_{i-f2} which differs from intermediate frequency f_{i-f1} of the main channel. The amplified noises pass from the outputs of preamplifiers 4,5 in turn through switch 6, which works in sync with switch 3, to the input of i-f amplifier 7 tuned to frequency f_{i-f1} of amplifier 4. For subsequent mixing of intermediate frequencies f_{i-f1} and f_{i-f2} between the output of amplifier 5 and input I of switch 6 there is shifting converter 8 which converts the noises of frequency f_{i-f2} with noises relative to frequency f_{i-f}. Thus, the noise powers relative to the same frequency f_{i-f} are fed to outputs I and II of switch 6. By regulating the transmission factor of converter 8, power equalizations are aimed for at inputs I and II of switch 6, eliminating the parasitic modulation of mixer 1 noises with respect to i-f amplifier 7. As an indicator of the equalization of noise powers at inputs I and II, meter 9 is used; the zero position of the pointer of the meter characterizes the absence of a variable component of modulation frequency at the output of detector 10 which forms, together with i-f amplifier 7, modulation-frequency amplifier 11, and phase detector 12, the SHF measuring receiver.

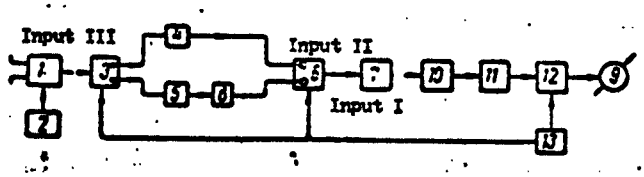
Master generator 13 is used to feed voltage to phase detector 12 and for commutation of synchronous switches 3 and 6. If, for example, a signal of frequency f_s is supplied to input III of mixer 1, then when $f_s - f_h = f_{c-f1}$, where f_h is the signal of the heterodyne, the converted signal will pass only through amplifier 4, i.e., it will be modulated with the frequency of operation of switches 3 and 6. Frequencies f_{i-f1} and f_{i-f2} are dispersed such that the converted signal

f_{i-f1} passes only through amplifier 4 and is 20-30 db greater than the signal passing through amplifier 6 and converter 8.

The creep of a signal through amplifier 5 and converter 8 forms an antiphase-modulated signal at the input of i-f amplifier 7 and aids in decreasing the modulation value. Thus, with a signal differences of the order of 20 db, the modulation is 99% of the power. When receiving a noise signal, an additional decrease of modulation occurs due to the fact that together with frequency f_{i-f1} from the output of mixer 1 there will be a converted signal in a band relative to frequency f_{i-f2}. Since at the input of mixer 1 for measurements with noise signals there is normally a filter with attenuation of the signal of the order of 20 db at a frequency of the mirror channel, then with accurate distribution of frequencies f_{i-f1} and f_{i-f2} the signal is prevented from passing through i-f preamplifier 5 of the compensation channel.

Object of the Invention

This SHF superheterodyne measuring receiver based on patent No. 118081 is distinctive in that to decrease the instability of compensation of parasitic modulation of mixer noises, mixer noises which are not combined with the spectrum of the signal, are used as the source of compensation channel noises for which an i-f preamplifier of the compensation channel is designed for an intermediate frequency different from that of the main channel, while for subsequent combination of intermediate frequencies a shifting frequency converter is used.



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